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Factors influencing student achievement in Vietnam

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Abstract

This paper examines what factors and the extent to which they contribute to differences in reading and mathematics achievement among Year 5 students in Vietnamese schools. The data were obtained from 59,601 students involved in a 2007 national year 5 survey of student achievement. The data were analysed using hierarchical linear modelling - HLM (Raudenbush, Bryk, Cheong and Congdon, 2004). 24 variables relating to student, school and province characteristics were found to have significant associations with student achievement. The important influences on mathematics achievement were:

School mean of parent average years of education

- Student family possession index
- Student parents' average years of education
- Student enrolment in full day school program.

Keywords: Achivement; multilevelmodelling; influences; vienam.

1. Introduction

The Vietnamese education system is increasingly being seen as providing pathways to national economic development. This trend, coupled with the enormous expenditures that are devoted to education, has precipitated demands by governments and the public for higher levels of accountability concerning the quality of teaching and learning. This study aims to identify factors which contribute to the differences in reading and mathematics achievement among Year 5 students in Vietnamese schools. The outcomes of the study will lead to evidence-based recommendations on how to improve student leaning outcomes. The outcomes of the study will inform the donor agencies such as the World Bank and Asian Development Bank of the directions of the new loan projects to boost student achievement. At the system level, the findings will provide professionals with the list of factors that are strongly associated with student achievement so that appropriate interventions can be made.

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2. Hypothesised model

International research on factors influencing student achievement (Ainley, Graetz, Long and Batten, 1995; Cresswell & Underwood, 2004; Hungi, 2007; Nguyen, Wu and Gillis, 2005; Nguyen, Griffin and Wyn, 2004; Rothman and McMillan, 2003; World Bank, 2004) leads to a list of the most commonly studied factors and the hypothesised model of factors influencing student achievement as presented in Figure 1.

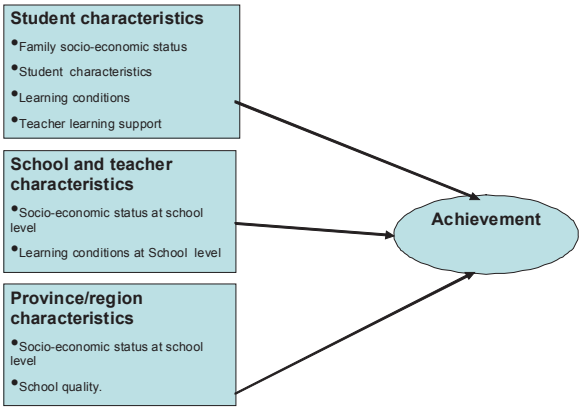

Figure 1: Hypothesised model of factors influencing student achievement

In accordance with the theoretical framework presented in chart 1, 17 student variables, 24 school variables and 11 province variables were included in the hypothesised model predicting student achievement in reading and mathematics. These variables were presented in Table 1.

Table 1. Theoretical framework of factors influencing student achievement and indicators

FACTOR NAME	INDICATOR/VARIABLE LABEL
STUDENT LEVEL	
Family socio-economic status	Ethnicity Speak Vietnamese at home Family possession Parent education
Student characteristics	Number of meals per day Gender Health status Sum of repeated class Age
Learning conditions	Studying place Minutes to school Number of days absent from school Sum of learning tools Sum of study materials Hours studying at home
Teacher feedback	Full day schooling Teacher feedback
SCHOOL LEVEL	
Socio-economic status at school level	School location Parent education - school mean Student ethnicity - school mean Family possession - school mean Help family - school mean
Student Learning conditions - School environment	Minutes to school - school mean Number of days absent from school - school mean Learning tools - school mean Study materials - school mean Private tutoring - school mean Hours studying at home - school mean
Teachers dedication to teaching	Teacher feedback - school mean

	Teacher time for planning and marking - school mean
	Extra work - school mean
	PD in new curriculum and textbooks - school mean
	Teachers with university degree in pedagogy - school mean
Staff qualifications/experience	Highest pedagogical level - school mean
	Level of excellent teacher award - school mean
	School head's years of teaching - school mean
	National Standards - school mean
School resources	Fundamental school index - school mean
	Teacher-class ratio - school mean
	Class learning tools - school mean
Leadership	School head observation of teaching - school mean
	Periods observed - school mean
PROVINCE LEVEL	
	Ethnicity - province mean
Student Socio-economic status at province level	Sum of possessions - province mean
	Parent education - province mean
	Economic zone - province mean
	Teacher-class ratio - province mean
School quality at province level	Private tutoring - province mean
	Fundamental school index - province mean
	Teachers with university degree in pedagogy - province mean
Teachers qualifications at province levels	Level of excellent teacher award - province mean
	PD in new curriculum and textbooks - province mean
Leaderships in monitoring teaching	School head observation of teaching - province mean

3. The data and analysis

The data file contained a 2007 national sample of 59,601 students from 64 provinces and 3,975 schools based on a stratified two-stage cluster sample design. Schools were selected first and then clusters of 15 students were selected within schools. Students within a school, thus, have many common factors, such as shared learning experiences, geographical region and school location that belong to the neighbourhood where schools are located. For some factors there may be little difference between students in the one school. There may also be similarities between schools from a single province in terms of the provincial socio economic development, educational management and environment. The analyses presented here use hierarchical linear modelling (HLM) and software developed for such analyses (Raudenbush, Bryk, Cheong and Congdon, 2004). HLM provides an estimation of effects and an understanding of the sources of variation in achievement scores by separating student-level (within-school) and school level (between-school) and province level (between-province) variances. Two separate models for reading and mathematics were developed and analysed. Each proceeded in a similar fashion. HLM does not allow missing data at school and provincial level. At the student level HLM deletes missing data list wise. Therefore, it was decided to rebuild the full data set by replacing the missing data with the mean of the variable if the variable is a continuous one. For categorical variables, missing values were replaced by the mode of the variables.

At the first step of each analysis, a 'null model' was used to determine the variance components of each of the three levels in order to distribute explained variance over each of the three levels within the total explained variance of the outcome variable. At the second step, each student level variable was examined for its separate contribution to reducing the explained variance in the outcome variable (reading or mathematics). This approach, combined with the variables with substantive contribution to the outcome variable or variables which have been suggested in the literature as having important impacts on student achievement, were retained in the model. At the third step, a student level variable model was analysed. Some variables did not contribute to an explanation of student achievement variance. These variables were removed from the model. This process however was not straight forward. Both step-up and backward approaches were used. In addition, malleable variables and variables which were strongly recommended by other research as important predictors to student achievement were retained until they consistently showed non-significant contribution across several models. At the fourth step school level variables were added and at the fifth step province level variables were modelled and added to the analysis. At the sixth step the final model with significant factors were analysed and reported.

4. Results

For ease of interpreting results all variables were entered to the HLM model as un-centred, i.e., keeping its initial metric. The intercepts and slopes of the final models with variables that significantly influenced reading and mathematics achievement are presented in Table 2 . The absolute values of standardised coefficients ('effect size') can be used to rank variables in terms of their relative strength of influence on the outcome within the same sample, while those of metric coefficients can be used to compare different samples with each other (see Hox, 1995, p. 26 quoted in Hungi, 2008).

The standard errors of the metric coefficients are reported in Table 2. As weighting (using sampling weight at school and student levels) was taken into account with HLM analyses, the sampling design was taken into consideration in determining standard errors. This is important as the coefficients displayed in Table 1 are significant at p=0.05 if their values taken in absolute terms were more than twice their standard errors.

The signs of metric and standardised coefficients indicate directions of effects and can be interpreted from the coding. For example, negative coefficients for the variable "age in months" indicate that younger pupils were estimated to achieve better in mathematics and reading than older pupils. The positive coefficients for Parent average years of education indicate that pupils whose parents had higher than average years of education achieved better in mathematics and reading than pupils whose parents had lower than average education years.

The absolute values of standardised coefficients or 'effect size' can be used to rank variables in terms of their relative degree of influence on the outcome within the same sample, while those of metric coefficients can be used to compare different samples with each other (Hox, 1995, p. 26 in Hungi, 2008). As a rule of thumb, a standardized regression coefficient is considered important if its magnitude taken in absolute terms is equals or higher 0.10 (Hungi, 2008).The effects sizes for reading were generally low (less than 0.08). For Mathematics, the factors whose affect sizes were larger than 0.10 were:

- School mean of parent average years of education
- Family possession index
- Parent average years of education
- Student enrolment in full day program

For recommendation-making, it is better to consider the variables with relatively strong effect sizes. For mathematics these variables are: teacher feedback (0.09), student health status (-0.09), school head observation of classroom at provincial level (0.08), school fundamental index (0.07) and student ethnicity (0.07). For reading variables with a relatively strong effect size are family possession (0.08), parent education (0.07) and gender (0.08).

It means that when holding all other variables constant:

- Students enrolled in a school where parents had higher average years of education performed better than those who had enrolled in a school with lower parent average years of education. Student achievement would improve by 2.3 score points in reading and 2.8 score points in mathematics if enrolling in a school where the average parent education is 1 year higher.
- With an additional average family possession, a student could improve his/her score by 4.2 in mathematics and 3.3 in reading.
- With an additional year of formal education of parents (from scale from 5 (primary education) to 19 masters/Ph.D), the child's achievement would improve by 2.6 points in mathematics and 2.4 in reading.
- Students would improve 17 points in mathematics and 12 points in reading if moving from half day classes to two half days classes or from two half day classes to full day schooling

Table 2. The estimated effects from the final three-level models for reading and mathematics

		Reading (N=59601)			Mathematics (N=59601)		
	Factor name	**Standardised (a)**	**Metric (b)**	**SE (c)**	**Standardised (d)**	**Metric (e)**	**SE (f)**
Province level							
Leadership	Intercept		305.14	17.29		261.83	21.50
	School head observation of teaching	0.04	0.36	0.15	0.08	0.50	0.19
School level							
School socio-economic background	School location	0.04	6.23	1.95			2.50
	Parent average years of education	0.06	2.31	0.43	0.10	2.84	0.55
Teaching and leadership	Teacher feedback	0.06	21.56	3.70	0.09	28.49	3.94
	Time for planning and marking	0.02	1.85	0.81			0.81
	Teaching excellent awards	0.02	3.34	1.54	0.04	4.70	1.82
	Grade 5 Periods observed	0.02	1.97	0.77	0.04	3.76	0.89
School Resources	Fundamental school index	0.04	0.46	0.10	0.07	0.61	0.15
	Class learning tools	0.04	3.13	0.72	0.05	3.73	0.97
Student level							
Socio-economic status	Ethnicity	0.04	11.24	2.19	0.07	16.71	3.17
	Family possession	0.08	3.28	0.21	0.13	4.28	0.26
	Parent average years of education	0.07	2.37	0.16	0.10	2.57	0.21
Student characteristics	Gender	0.08	18.60	0.90	0.02	3.30	1.08
	Health status	-0.06	-6.77	0.49	-0.09	-8.38	0.52
	Age in month	-0.04	-0.58	0.06	-0.05	-0.64	0.10
Learning condition	Number of meals per day	0.04	9.44	1.10	0.06	12.65	1.29
	Minutes to school	-0.02	-0.17	0.03	-0.03	-0.28	0.05
	Number of days absent from school	-0.03	-1.95	0.26	-0.05	-2.81	0.46
	Sum of repeated class	-0.05	-7.28	0.51	-0.06	-7.94	0.67
	Sum of learning tools	0.03	4.00	0.38	0.05	4.88	0.49
	Hours studying at home	0.02	4.03	0.64	0.05	7.14	0.91
	Enrolment in full day schooling program	0.06	12.34	2.14	0.10	17.11	2.86
Teacher support	Teacher feedback	0.03	5.88	0.77	0.04	7.08	1.14

with lunch provided in schools. That is, the more time spent at school the higher the performance.

- At school level, on average, as teachers moving from not giving feedback to sometimes giving feedback or from sometimes giving feedback to regularly giving feedback, students in school would improve by 28 points in mathematics and 21 points in reading.
- Ten additional periods the school principals observed each year would lead to 3.5 points improvement in reading and 5.0 points improvement in maths. Class observation by the school principal would ensure that teaching was being monitored regularly and teachers would gain a lot from the principal's constructive comments.
- When the fundamental school quality level input index improves 10 points (on a 100 point scale), student achievement would improve 6.1 score points in mathematics and 4.6 points in reading.
- Gender did not have much influence on mathematics achievement (female was coded as 1 and male was coded as 2). However, gender did make a difference in reading achievement. A female student would outscore their male counterpart by 18.6 points in reading and 3.3 point in mathematics.
- Students with each of the health problems (such as short sightedness, listening disorder, forgetfulness, sickness) would score 7 points lower in reading and 8 point lower in mathematics.

5. Variance components

The contributions of each of the three levels, provincial, school and student are disentangled and presented in Table 3.

Table 3.Variance components of the model

	Student	School	Province	Total
Reading				
Variance available at each of the levels	59.2%	28.7%	12.1%	100.0%
Variance explained from the level total	12.2%	30.1%	86.8%	
Variance explained from the total	**7.2%**	**8.6%**	**10.5%**	**26.4%**
Variance unexplained from the total	52.0%	20.1%	1.6%	73.6%
Mathematics				
Variance available at each of the levels	58.5%	25.9%	15.7%	100.0%
Variance explained from the level total	7.7%	38.9%	82.2%	
Variance explained from the total	**4.5%**	**10.1%**	**12.9%**	**27.5%**
Variance unexplained from the total	63.1%	15.8%	2.8%	72.5%

It can be seen from the data presented in Table 3, that the percentages of variance at school levels for each of the two subjects were much lower than those reported by Hungi (2008) when analysing the 2001 survey data. This indicates that after six years, the between-school differences decreased to a larger extent. This was also reported by Griffin and Nguyen (2009) in a study of the intra class coefficients by region. Significant lowering of between-school differences (compared to within-school) was a common observation. By 2007, the between-school difference for both subjects in Vietnam had become similar to those reported for other developing countries. The model for Reading achievement explained 26.4% of the variance and for Mathematics it was 27.5%. For both Mathematics and Reading achievement, the variables included in the final models explained more than 80% of the between-province variance and about 30% of the between-school variance, but those at the student level were relatively low.

6. Conclusions and Recommendations

The finding has shown a strong link between socio-economic status (family possession and parent education SES) and student achievement. Family possession and parent education appear not malleable by the educational system itself and cannot be intervened immediately**.** It is suggested that further research be conducted to explore the

nature of this association and how to effectively reduce the achievement gaps between different SES groups. It is however interesting to note that holding SES and other factors in the model constant, the effect of student enrolment into full time programs at school is consistently high. This implies that the initiatives of the Ministry of Education and Training (MOET) in promoting full day school programs in Vietnamese primary schools should be fully supported and upscaled (Nguyen, Griffin, Ure and Pavlovic, 2008).

In Vietnam so far, summative assessment was given more attention due to the pressure of ranking and screening students into different streams (i.e., accelerated, gifted, ranking schools) rather than formative assessment. The importance of feedback on student achievement in mathematics implied that formative assessment, where teachers give feedback to students, should be promoted.

The result of the analysis has indicated that the leadership skills at the provincial level does make a difference in student achievement and that students from the provinces where principals devoted to classroom monitoring achieve better than students from provinces where classroom observation was not an important part of the principal's agenda. In Vietnam, students from some provinces continued to outperform students from other provinces. Further study into the role of school leaders in classroom observation practice in the successful provinces should be conducted. The analysis also suggested that evidence of principal observation of classroom teaching should be part of the principal appraisal procedures.

The finding also showed that net of other factors, schools with good resources will lead to higher achievement. As a result both schools and MOET should find ways to improve school resources. It is surprising that teacher qualifications were not found to be an important factor. As information on teacher subject knowledge was not available in the 2007 national survey of student achievement teachers did not take the test, it was not possible to test the impact of teacher subject knowledge on student achievement, which was found a strong factor influencing student achievement in both subjects in 2001 (Hungi, 2008).

In relation to the influences of gender, the finding that females perform better than males in reading was consistent with the findings from international studies (Cresswell and Underwood, 2004; Rothman and McMillan, 2003). As reading is an important skill, it is recommended that teachers and curriculum designers find ways to improve male students' reading competency.

Last but not least, while student health status is not malleable by the school, measures should be found to support school and teachers to cater for the diversity of the needs of the students with health problems.

References

Ainley, J., Graetz, B., Long, M. & Batten, M. (1995). *Socioeconomic status and schooleducation*. Canberra: Australian Government Publishing Service.

Cresswell, J. & Underwood, C. (2004). Location, Location, Location: Implications of Geographic Situation on Australian Student Performance in PISA 2000 (ACER Research Monograph No. 58), Melbourne: ACER.

Griffin, P. & Nguyen, T.K.C. (2009). Analysis of Panel data for the 2001 and 2007 Survey data in Vietnam. Report presented to DFID, Hanoi.

Hox, J.J. (1995). *Applied multilevel analysis* Amstedam:TT-Publikaties

Hungi, N.(2008). Examining differences in mathematics and reading ac among Grade 5 pupils in Vietnam. *Studies in Educational Evaluation* 34:155-164

Nguyen, T.K.C., Wu, M.L., & Gillis, S. (2005). *Factors influencing achievement levels in the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ)II.* International Invitational Educational Policy Research Conference, Paris: IIEP.

Nguyen, T. K. C., & Griffin, P., & Wyn, J. (2004). *Family and student influences on withdrawal from rural Vietnam. Australian Association for Research in Education*, AARE 2004 International Education Research Conference, The University of Melbourne.

Nguyen, C., Griffin, P., Ure, C., & Pavlovic, M. (2008). Study in Teacher Quality: Report on survey for primary school principals and teachers, Ministry of Education and Training, Vietnam School Education Quality Assurance Project (pp. 160). Melbourne: Assessment Research Centre.

Raudenbush, SW., Bryk AS., Cheong, Y F. & Congdon, RT. (2004). HLM6: Hierarchical Linear and Nonlinear Modelling Scientific Software International

Rothman, S. and McMillan, J. (2003). Influences on achievement in literacy and Numeracy. Longitudinal Survey of Australian Youth Australian Council for Educational Research

World Bank, (2004). Vietnam reading and mathematics assessment study. Volume 2.